

August 15, 2002

Bruce Rodger  
Wisconsin Department of Natural Resources  
101 S. Webster Street  
Madison, WI 53707-7921

Re: Mayville, Wisconsin Visibility Study  
Addendum to Annual Report for the Period December 1, 2000 – December 31, 2001

Dear Bruce:

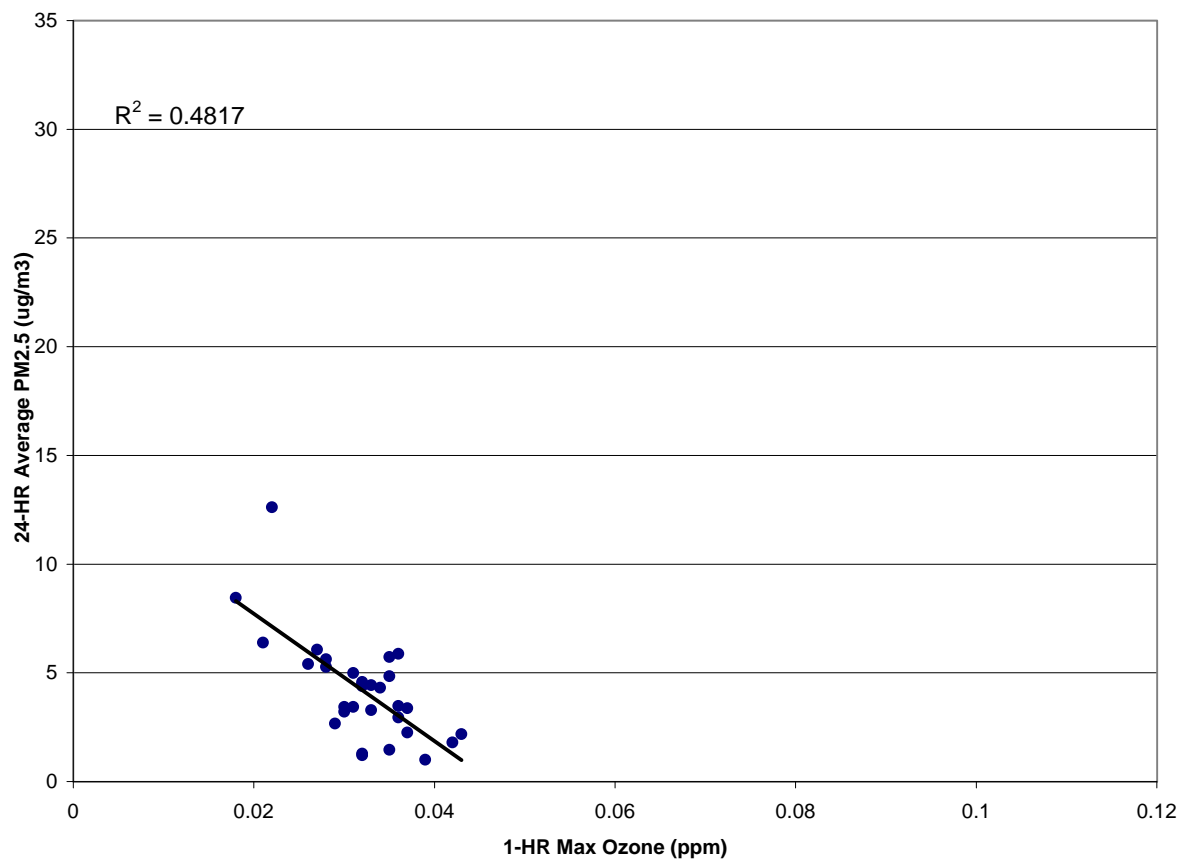
After reading the enclosed technical paper, *Historic PM<sub>2.5</sub>/PM<sub>10</sub> Concentrations in the Southeastern United States – Potential Implications of the Revised Particulate Matter Standard*, we revised the Ozone vs. PM<sub>2.5</sub> scatter plots (Figure C-3 and C-4) in the annual report. The new figures present a comparison of the maximum daily 1-hr ozone value with the 24-hr average PM<sub>2.5</sub> value rather than a comparison of the 1-hr average ozone value and 1-hr average PM<sub>2.5</sub> value. The maximum daily 1-hr average is believed to be a better indicator of the overall photochemical productivity, which tends to increase the rate of formation of sulfate, nitrate, and some organic aerosols which contribute to PM<sub>2.5</sub> mass. Enclosed are two (2) copies of the revised Figures (C-3 and C-4), page 4-2 of the annual report.

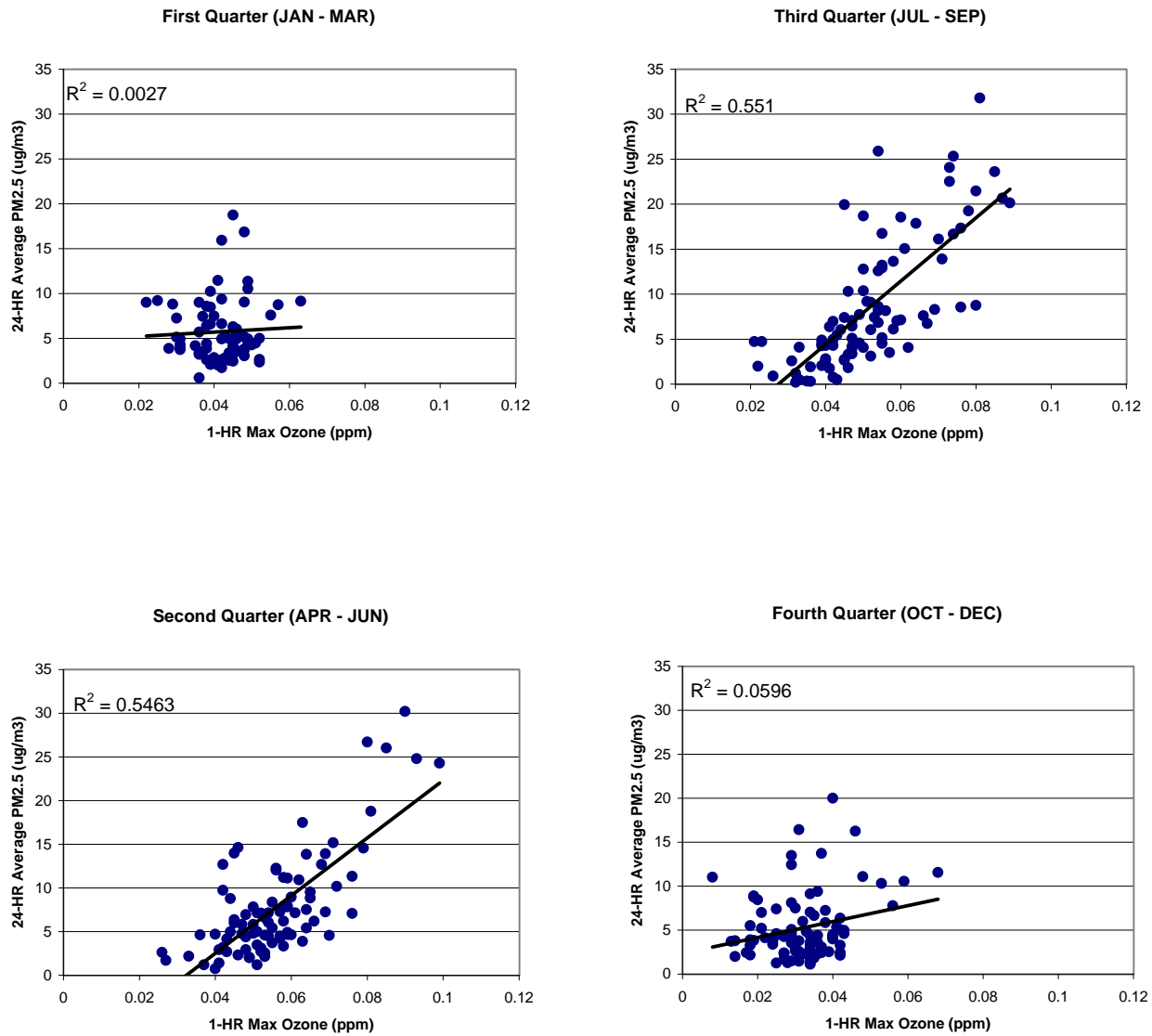
Please contact me if you have any questions regarding these changes or if you require a PDF copy of the enclosures.

Sincerely,

Heather Wayne  
Project Scientist

Enclosures





### 4.3 METEOROLOGICAL SUMMARY STATISTICS

Meteorological summary statistics for the reporting period are summarized by parameter in Appendix A.

Wind roses for the reporting period can also be found in Appendix A. Note that the wind roses in this report vary slightly from the wind roses that were presented in the Mayville Visibility Study preliminary reports. This variation is due to differing data validation techniques between ARS and Wisconsin DNR. Wisconsin DNR data validation protocol is, if the winds speed falls below 3mph the wind speed and wind direction are set equal to 0 to denote calm conditions.

### 4.4 TIMELINE OF AIR QUALITY AND METEOROLOGICAL DATA

Timeline plots of final validated air quality and meteorological data are provided in Appendix B. Note that the particle scattering (Bsp) that is plotted in the timeline plots is filtered data.

### 4.5 RELATIONSHIP BETWEEN AIR QUALITY PARAMETERS

Scatter plots summarizing the relationship between air quality parameters can be found in Appendix C.

A direct relationship between particle light scattering (Bsp) and total  $PM_{2.5}$  is not possible to determine because different components of the  $PM_{2.5}$  have different light scattering efficiencies, and the Bsp is measured in ambient RH conditions, but the  $PM_{2.5}$  is determined under fairly dry conditions. The scatter plots in Figures C-1 and C-2 show a variable relationship which depends on the season. This variability is likely due in part to periods of higher sustained relative humidity in the 1<sup>st</sup> and 4<sup>th</sup> quarters. The  $R^2$  between  $PM_{2.5}$  and light scattering is shown to range from 0.50 to 0.70.

The relationship between maximum daily 1-hr average ozone and 24-hr average  $PM_{2.5}$  is illustrated in Figures C-3 through C-4. The maximum daily 1-hr average was used as the metric for comparison with 24-hr average  $PM_{2.5}$  because it is believed to be a better indicator of the overall photochemical productivity, which tends to increase the rate of formation of sulfate, nitrate and some organic aerosols which contribute to the  $PM_{2.5}$  mass (Parkhurst et al.)<sup>1</sup>. The scatter plots show a variable relationship which depends on the season. There is a significant correlation between ozone and  $PM_{2.5}$ , during the 2<sup>nd</sup> and 3<sup>rd</sup> quarters ( $R^2 = 0.55, 0.55$ ) and essentially no correlation during the 1<sup>st</sup> and 4<sup>th</sup> quarters ( $R^2 = 0.00, 0.06$ ).

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<sup>1</sup> Parkhurst, W. J., R. L. Tanner, F. P. Weatherford, R. J. Valente, and J. F. Meagher, *Historic PM<sub>2.5</sub>/PM<sub>10</sub> Concentrations in the Southeastern United States – Potential Implications of the Revised Particulate Matter Standard*, Journal of the Air & Waste Management Association, Volume 49, September 1999.